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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,947	08/24/2001	Timothy M. Woudenberg	5010-001	2655

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EXAMINER	
MUTSCHLER, BRIAN L	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/938,947	WOUDENBERG ET AL.	
	Examiner	Art Unit	
	Brian L. Mutschler	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2004 and 15 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-14,16-30 and 32-71* is/are pending in the application.

4a) Of the above claim(s) *37-71* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-7,16-23 and 32-36* is/are rejected.

7)☒ Claim(s) *8-14 and 24-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *20040809* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Comments

1. The objection to the specification has been overcome by Applicant's amendment.

2. The objection to the claims has been overcome by Applicant's amendment.

3. The rejection of claims 15 and 31 under 35 U.S.C. 112, first paragraph, has been overcome by Applicant's cancellation of the claims.

4. The rejection of claims 1-36 under 35 U.S.C., second paragraph, has been overcome by Applicant's amendment to the claims.

5. The rejection of claims 1-7, 16-23, and 32-36 under 35 U.S.C. 102(b) over Bjornson et al. (U.S. Pat. No. 6,103,199) has been overcome by Applicant's amendment to the claims.

6. The rejection of claims 1-6, 13, 14, 16, 18, 20-23, 29, 30, 32, 34, and 35 under 35 U.S.C. 102(e) over Cabilly et al. has been overcome by the declaration filed September 15, 2004, which provides evidence as to why the electrode of Cabilly et al. is structurally different from the claimed bubble-free electrode. In particular, the declaration shows that during the operation of the electrode of Cabilly et al., the electrode would be incapable of absorbing the quantity of hydrogen necessary to meet Applicant's definition of a pre-charged electrode.

7. The rejection of claims 1-7, 16-23, and 32-36 under 35 U.S.C. 103 over Ramsey in view of WO '850 has been overcome by Applicant's amendment to the claims.

8. The rejection of claims 8-12 and 24-28 under 35 U.S.C. 103 over Cabilly et al. in view of Yano et al. has been overcome by Applicant's amendment to the claims and the filed declaration.

Election/Restrictions

9. Applicant's election with traverse of Group I in the reply filed on July 16, 2004, is acknowledged. The traversal is on the ground(s) that Groups II and VI should have been a single group and Groups VIII and X should have been a single group because of the similar classification. This is not found persuasive because classification is only one element by which restriction may be considered proper. While some groups of the restriction may be classified in the same subclass, they still recite distinct inventions and the search for one group within a subclass does not require the same search for another group within the same subclass. Furthermore, the traversal of the restriction requirement does not relate to the elected group.

The requirement is still deemed proper and is therefore made FINAL.

Declaration

10. The declaration under 37 CFR 1.132 filed September 15, 2004, is sufficient to overcome the rejection of claims 1-6, 8-14, 16, 18, 20-30, 32, 34, and 35 based upon Cabilly et al. (U.S. Pat. No. 6,379,516).

Drawings

11. The drawings were received on July 16, 2004. These drawings are acceptable.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1, 5-7, 16-23, and 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramsey (U.S. Pat. No. 6,001,229) in view of WO 00/74850 (herein referred to as WO '850) and in view of Goetz (U.S. Pat. No. 4,351,709).

Regarding claims 1, 20, and 34, Ramsey discloses a microfluidic device comprising an electrochemical cell having anodic and cathodic reservoirs **32** and **36** with electrodes **40** and **44** disposed therein, a sample reservoir **30** for the injection of a sample, and a connection **54** between the reservoirs (fig. 1; col. 4, lines 32-53). The device further comprises a power source and a polarity switching device for switching the polarity of the electrodes (figs. 1 and 21a-21c; col. 4, lines 38-41; col. 15, lines 9-13).

Regarding claims 18 and 32, the device is used to electrophoretically move samples and is capable of reversing the polarity (col. 5, lines 44-56; col. 15, lines 9-13).

Regarding claims 5 and 21, the electrodes are made of platinum (col. 4, lines 36-38).

Regarding claims 16, 17, 35, and 36, the device uses electroosmosis and electrophoresis (col. 2, lines 18-21).

Regarding claims 19 and 33, Ramsey disclose that the device is operated between 60 V/cm and 1,500 V/cm, which provides a voltage within the range recited in the claims (col. 8, lines 29-44).

The device of Ramsey differs from the instant invention because Ramsey does not disclose the following:

a. At least one electrode is a bubble-free electrode having been pre-charged as a cathode to have hydrogen absorbed therein, as recited in claims 1 and 20.

b. At least one electrode comprises a palladium metal material, as recited in claims 6 and 22.

c. Both electrodes comprise a palladium metal material, as recited in claims 7 and 23.

Regarding claims 1, 6, 7, 20, 22, and 23, WO '850 teaches that gas bubbles interfere with uniform flow within microchannels, and teach the use of nongassing electrodes such as palladium and platinum electrodes to prevent such bubbles from forming (page 8, last paragraph; page 15, second paragraph).

Goetz further teaches that a palladium electrode that has been cathodically charged with hydrogen can "function as a non-gassing anode until the hydrogen charge is depleted" (col. 8, lines 41-68). Goetz further teaches that this feature is "highly

advantageous in electrophoresis apparatus...where an electric field of reversing polarity is applied" (col. 8, lines 41-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the platinum electrode of Ramsey to use a bubble free palladium electrode as taught by WO '850 because gas bubbles interfere with the uniform flow of microchannels. It would further have been obvious to have pre-charged the palladium electrode with hydrogen because Goetz teaches that such an electrode, which can remain bubble-free until the hydrogen is depleted, is "highly advantageous" in electrophoresis apparatus with switching polarities.

14. Claims 1, 5-7, 16-23, and 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjornson et al. (U.S. Pat. No. 6,103,199) in view of Goetz (U.S. Pat. No. 4,351,709).

Regarding claims 1, 20, and 34, Bjornson et al. disclose a capillary electroflow apparatus comprising an electrochemical cell having anodic and cathodic reservoirs **132** and **136**, wherein each reservoir has an electrode **130** and **134** made of a material such as palladium, which absorbs hydrogen and is capable of operating in a bubble-free manner (fig. 4; col. 20, lines 18-32; col. 23, lines 48-59). A channel **122** connects the reservoirs (fig. 4). The device further comprises a power source to connect to the electrodes and means to invert the polarity of the electrodes (col. 22, lines 12-31). Bjornson et al. also disclose a sample introduction port and reservoir **142** to introduce a sample into the device (fig. 4; col. 20, lines 18-32).

Regarding claims 18 and 32, the device can be used to induce electrokinetic movement and can switch the polarity of the electrodes (col. 11, lines 55-60; col. 22, lines 12-31).

Regarding claims 5-7 and 21-23, Bjornson et al. disclose that the electrodes may comprise palladium (col. 23, lines 48-59).

Claims 16, 17, 35, and 36, the device is used to induce electroosmotic flow or electrophoretic flow (col. 11, lines 55-60).

Regarding claims 19 and 33, the power source can deliver fields of 10 to 1000 V/cm, which provides a voltage within the range recited in the claims (col. 22, lines 12-26).

The apparatus of Bjornson et al. differs from the instant invention because Bjornson et al. do not disclose that the bubble-free electrode is pre-charged as a cathode to have hydrogen absorbed therein, as recited in claims 1 and 20.

Goetz teaches that hydrogen gas is commonly evolved at the cathode and oxygen gas is evolved at the anode, and that such gassing is "extremely undesirable" (col. 8, lines 41-68). Goetz further teaches that a palladium electrode that has been cathodically charged with hydrogen can "function as a non-gassing anode until the hydrogen charge is depleted" (col. 8, lines 41-68). Goetz further teaches that this feature is "highly advantageous in electrophoresis apparatus...where an electric field of reversing polarity is applied" (col. 8, lines 41-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the palladium electrode of Bjornson et al. to have

pre-charged the palladium electrode with hydrogen because Goetz teaches that such an electrode, which can remain bubble-free until the hydrogen is depleted, is "highly advantageous" in electrophoresis apparatus with switching polarities because it can avoid the "extremely undesirable" effects of gassing at the electrodes.

Response to Arguments

15. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

16. The amendment filed July 16, 2004, added the limitation requiring the bubble-free electrode to be "precharged as a cathode to have hydrogen absorbed therein." This limitation had not been claimed before and required an additional search. Rejections set forth in the prior Office action have been modified to reflect this amendment.

Allowable Subject Matter

17. Claims 8-14 and 24-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:

Claims 8-14 and 24-30 are distinguished over the prior art by providing materials that can be cathodically pre-charged to absorb hydrogen to provide electrodes that

operate in a bubble-free manner when used as anodes. While the prior art teaches the use of pre-charged palladium anodes, the prior art of record neither teaches nor suggests the use of the claimed materials, which include nickel hydroxide, nickel-cadmium, ionic liquids, or ionic conductors that are capable of absorbing hydrogen gas.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (571) 272-1341. The examiner can normally be reached on Monday-Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLM
September 16, 2004

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